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TO : The Files DATE: 25 November 1957

FROM : [redacted] 25X1

SUBJECT : Trip Report - Contract RD-103, Tasks 1 - 7

1. On 4 and 8 November the [redacted] was visited for the purpose of inspecting the progress of Contract RD-103, Tasks 1 - 7. The following persons of the [redacted] were contacted: 25X1 25X1

[redacted] 25X1

2. Arrangements were made following Task inspection for a thorough tour of the model shop and manufacturing facilities. The latest techniques in component miniaturization, manufacturing, fabrication and assembly are employed at the [redacted]. Their manufacturing plant is purported to be the finest on the west coast. 25X1

3. The seven tasks with this contractor were covered with the engineering personnel concerned.

a. Task 1 - [redacted] - Fabrication of the six prototype sets has been completed. The fifth set was brought back on my return trip to Washington. The sixth set is to be GFE'd to Task 4. This task and Task 2 went beyond the expected completion date, consequently, extensions are being requested. The final report on Task 1 will be forwarded to us December 15th. This report will be in the nature of an instruction book. This report will contain schematics, operation instructions and the important resistance and voltage measurements. The Heiland Visicorder, a recording oscillograph, Model 906, with the 50-inch per second paper drive was demonstrated as the visual read-out device for the [redacted] into the [redacted] equipment. It worked very satisfactorily except there is no provision for automatic start. This is being remedied by the engineers at [redacted]. The cost of this model is about $4500 including the mirror galvonometers. I recommend the purchase of two of these recorders, one for [redacted] and one for the [redacted] installation. The recorder can be supplied in 30 days. A visit is to be made to the [redacted] with an [redacted] representative to discuss a task 4 problem. At this time, the [redacted] coder is to be shown to the [redacted] engineers to obtain a quote on a sub-contract for the coder in the event more [redacted] are produced. This unit has been largely hand-made by [redacted] for the six prototypes. The purchase of 3 sets of extra brushes at $37 each as spares was authorized under the Task 7 Service contract. 25X1 25X1 25X1 25X1 25X1 25X1 25X1 25X1 25X1 25X1 25X1 25X1 25X1

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b. Task 2 - High Speed Base Communications System, AS-4 - This task also requires a time extension as indicated above. This task will be closed out shortly. The drawings for this system, in the form which can be reproduced by an ozalid machine, are nearly finished. The [redacted] has requested a reproduced set for Task 3 use. A cost estimate has been requested for converting the standard AS-4 system to a modified high-speed processing capability. This would include the [redacted] system and Soroban high-speed punch with their associated electronics. 25X1 25X1

c. Task 3 - High Speed Processing Communications System, AS-4A - Present plans are for early January 1958 completion of the AS-4A prototype equipment. This will coincide with the Potter high-speed page printer delivery. The Receive RF and the Receive Data Terminals plus [redacted] will be used at Washington, D.C. for testing between Los Angeles and Washington early in 1958. The receive Data Terminal could be located in Washington proper and the Receive RF could be located at [redacted]. The audio tone link between them can be by wire or by microwave. Six [redacted] crypto systems are to be delivered to the Agency the week of November 18th. Two of these will be shipped to Los Angeles to the contractor. Two more will be used at this end for the Receive portion of the AS-4A, one KX-3 serving as a back-up for the other. The other two [redacted] will be used for training purposes. Requirements for use of the [redacted] call for a communications link between the Transmitter and Receiver. For the Los Angeles to Washington tests a land line could be used. However, use across the North Atlantic will require some CW or Voice communications capability within the AS-4A equipment as an order wire. Installation of the AS-4A equipment will require further training of the men trained in the AS-4 equipment in September 1957. [redacted] has quoted Mr. Al [redacted] a price of $800,000 for two AS-4A's. [redacted] 25X1 25X1 25X1 25X1 25X1 25X1 25X1 25X1

Should the Agency require another system, the problem would be the same. A further complication would be the anticipated overseas use of this equipment. In anticipation of future production requirements and also our R&D contract needs, th[redacted] management is permitting [redacted], project engineer, to expand his staff and equipment. It has been suggested that the AS-4A data handling capability could be used over a leased cable with 100% reliability. The complete AS-4A system could serve as an on the air back-up in the event of cable difficulty. 25X1 25X1

d. Task 4 - Automatic Data Transmission System, AS-6 - Getting this project off the ground is the present concern of both the [redacted] Company and the Agency. Surprisingly, the [redacted] was suggesting that the hardware development stage get underway before the feasibility study is completed at the same time that we were asking for an overlapping proposal from them. Mr. John [redacted], project engineer, will be visiting Washington November 20 to 22 to discuss the proposal that [redacted] will be submitting. A rough estimate for the work to be done under such a proposal is one million dollars plus 10% or minus 20%. A testing plan for the purpose of determining the feasibility of this automatic digital 25X1 25X1 25X1 25X1

transmission system has been submitted. This testing is to be carried out during the month of February from a location near Los Angeles back to the base station of L.A., then from Washington to L.A. and finally between Puerto Rico and L.A. During this test the interrogation information is to be carried by phase modulated pulses, the phase will be changed from pulse to pulse and the difference in phase will carry the intelligence. Before the tests are run the special antenna configurations should be tried by firing an RS-6 or RS-16A into them and measuring the output on a field strength meter to determine the efficiency of such antennas. The frequency range to be covered for this data transmission system has been found to be from 3 to 48 mc. However, the [redacted] propagation experts indicate that 3 to 30 mc can be used for this testing period. [redacted] is proceeding with the development of the 8 channel QFM technique for handling the data information. Data link specifications comparing the 6 channel and 8 channel have been forwarded to us by the contractor. If 8 channels are used, the increase in cost will be about 1% over the 6 channel configuration. Below are indicated three more possible QFM formats which have been suggested for comparison: 25X1 25X1 25X1

1. Use of 6 channels with 1-7/8 millisecond pulses. This could be done with delay lines that are presently used in the AS-4 equipment. This would lead to 5.6 milliseconds per Mark or Space and would provide 3.75 ms in gap protection. There would be 178 bits per second possible. On-the-air time would be 0.7 seconds.

2. Use of 6 channels with 1.25 ms pulses would increase the bandwidth but decrease the time on the air. There would be 2.5 ms gap protection. 266 bits per second would be possible. On-the-air time would be 0.47 seconds.

3. If 8 channels with a 1 ms pulse were used, there would be 3 ms protection. 250 bits per second are possible. On-the-air time would be 0.5 seconds.

e. Task 5 - High-Speed Sub-Base Station, AS-5 - [redacted] 25X1
Company engineers suggest the use of one input-output drawer in this system. The same drawer would be used for reading in and punching out tape. A previous suggestion was to use two drawers. Both of these plans involve the use of a paper tape memory. Messages would be written out on a Flexowriter which would give hard copy as well as punched tape. When ready for transmitting traffic, the stored paper tape with messages punched in would be put on the input reel and sent out at 1600 words per minute. For reliability the use of two drawers, one for input and one for output is best. The question of the use of two drawers instead of one is to be taken up with O&T.

f. Task 6 - Test Power Supplies for RS-16A - Commercial components for the power supplies are being located and purchased. Complete instructions for testing the RS-16A field sets will be furnished with these power supplies.

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g. Task 7 - Service and Support for RD-103 Contract - So far, approximately $18,000 in work or purchase of material has been authorized for the various tasks out of the total $44,000 available. This includes two big items totaling about $17,000, i.e. the AS-4 training for $9,000 and the RS-16A spares for around $8,000.

25X1

OC-E/R&D-EP/PCV:wlj (25 November 1957)
cc: RD-103, T.O. 1
T.O. 2
T.O. 3
T.O. 4
T.O. 5
T.O. 6
T.O. 7
R&D Subject File
Monthly Report (2)
OC/O&T
R&D Lab
R&D Chrono
EP Chrono

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